## 8.4 Let’s go for a ride

These are the answers a student has provided for the chapter questions at the end of chapter 8.4.

About 70% of these are correct but 30% are wrong. Your job is to identify the incorrect answers and correct them.

1. The gravity prevents a bus from falling through the surface of a road.

2. (a) (i) You’d be thrown quickly backwards in your seat.

(ii) There would be no tendency to move in any particular direction.

(iii) You’d feel as if you were being pushed hard to the   
backward - right.

(iv) You’d feel very little change in your motion.

(v) You would be thrown backwards from your seat at a high speed.

(vi) You would be thrown backwards; how hard would depend on the size of the other vehicle and the speed with which it ran into the bus.

(b) In (ii) and (iv).

(c) Properly fitting seatbelts keep the passenger in contact with the seat so that they are affected as a single system. This way, if the vehicle decelerates rapidly, car, seat and passenger should all decelerate at roughly the same rate, reducing the risk of passenger injury due to inertia carrying them forward into the seatbelt or dashboard.

(d) It would prevent the passenger’s head travelling sideways as the bus accelerates forward as a result of the rear impact.

3. Air resistance and friction

4. An object will remain at rest, or will not change its speed or direction, unless it is acted upon by an outside, unbalanced force.

5. Inertia is the property of an object to resist changes to their motion.

6. (a) Thrust

(b) Resistance forces

(c) They combine to make it go forward.

7. When you step off you will have the same speed as the vehicle from which you have stepped. Your body will, therefore, continue to move with that speed until acted upon by a force. Newton’s First Law of Motion describes this behaviour. When stepping off a moving vehicle, you are likely to be pulled down to the ground before you can stop yourself with your feet.

8. (a) The two forces are friction and air resistance.

(b) The sizes of forces A and B are equal in size.

(c) Either a decrease in C or an increase in B would slow the car down.

9. (a) Turbulence caused sudden changes in the motion of the aircraft and the unrestrained passengers and crew continued to move with their original motion. They were injured as a result of impact with other people, the interior fittings or floor of the aircraft.

(b) The aircraft. During turbulence, there are rapid changes to the degree of lift acting on the aircraft wings, causing it to drop, tilt, yaw and rise in response.

(c) The seatbelts don’t do much for the passengers inside of the aircraft.

10. On Mars, a 60 kg student would have a weight of 60 kg × 3.7 N/kg = 232 N.